PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:

see form PCT/ISA/220

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY
(PCT Rule 43*bis*.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/GB2004/002808	30.06.2004	30.06.2003

International Patent Classification (IPC) or both national classification and IPC
H01M8/04, H01M8/06

Applicant
VOLLER ENERGY LIMITED

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☒ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notifed the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:

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Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

   ☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).

2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:

   a. type of material:

   ☐ a sequence listing

   ☐ table(s) related to the sequence listing

   b. format of material:

   ☐ in written format

   ☐ in computer readable form

   c. time of filing/furnishing:

   ☐ contained in the international application as filed.

   ☐ filed together with the international application in computer readable form.

   ☐ furnished subsequently to this Authority for the purposes of search.

3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:

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Box No. IV Lack of unity of invention

1. ☒ In response to the invitation (Form PCT/ISA/206) to pay additional fees, the applicant has:

   ☒ paid additional fees.

   ☐ paid additional fees under protest.

   ☐ not paid additional fees.

2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose not to invite the applicant to pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rule 13.1, 13.2 and 13.3 is

   ☐ complied with

   ☒ not complied with for the following reasons:

   see separate sheet

4. Consequently, this report has been established in respect of the following parts of the international application:

   ☒ all parts.

   ☐ the parts relating to claims Nos.

Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	11, 12, 22-34, 48-51
	No:	Claims	1-10, 13-21, 35-47
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-51
Industrial applicability (IA)	Yes:	Claims	1-51
	No:	Claims	

2. Citations and explanations

see separate sheet

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Re Item IV

See non-unity objection provided by the search report.

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

FIRST INVENTION

1. Reference is made to the following documents:

   D1: US 2002/114983 A1 (FRANK KENNETH M ET AL) 22 August 2002
   D2: WO 00/63993 A (ZENTRUM FUER SONNENENERGIE- UND WASSERSTOFF-FORSCHUNG BADEN-WUERTTEMBE) 26 October 2000

2. CLARITY

   Although claims 1, 7, 8, 10, 22, 27, 32, 35, 39 and 43 have been drafted as separate independent claims, the envisaged subject-matter could possibly be provided by one independent claim and several dependent claims. Moreover, lack of clarity as a whole arises, since the plurality of independent claims makes it difficult, if not impossible, to determine the matter for which protection is sought, and places an undue burden on others seeking to establish the extent of the protection. The aforementioned claims therefore lack clearness as well as conciseness and as such do not meet the requirements of Article 6 PCT. If the applicant insist on multiple independent claims, not only a clarity but also a three-fold non-unity objection for the searched claims will have to be raised during the next procedural stage (see the sub-inventions 1.1, 1.2 and 1.3 provided by the search report).

3. LACK OF NOVELTY

   The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 1-12 and 35-47 is not new in the sense of Article 33(2) PCT.

3.1 The document D1 discloses (the references in parentheses applying to this document):

A fuel cell system wherein system components are arranged to facilitate the transfer of heat from those components which generate heat in operation to those which cool in operation (paragraph [0037]).

The subject-matter of **claim 1** is therefore not novel.

3.2 Furthermore, dependent **claims 2-12 and 35-47**, do not contain any additional features which, in combination with the features of any claim to which they refer, are novel or involve an inventive step for the reason that the subject-matter of said claims is either directly derivable from the disclosure of document D1 (for claims 2-10: see paragraph [0037] and Figures 1 and 2; for claims 35-47, see paragraphs [0028] and [0030]) or represents simple design details which are generally known to the person skilled in the field of fuel canisters (claims 11 and 12).

4. LACK OF INVENTIVE STEP

The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 22-34 does not involve an inventive step in the sense of Article 33(3) PCT for the reason that the features of **claims 22-34** have already been employed for the same purpose in a similar fuel cell system described in Document D2, see the corresponding citations given by the search report.

SECOND INVENTION

5. Reference is made to the following documents:

D3: WO 03/032425 A (SONY CORPORATION; WATANABE, YASUHIRO) 17 April 2003
D4: US-B1-6 551 731 (BERG NORBERT ET AL) 22 April 2003

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For language reasons citations for D3 will relate to the translated document US2004067398, which was published after the priority date of the application.

6. LACK OF NOVELTY

The subject-matter of claims 13-17 is not new in the sense of Article 33(2) PCT.

6.1 The document D3 discloses (the references in parentheses applying to US2004067398):

A fuel canister for use with a fuel cell system (see paragraphs [0016] and [0017]), the canister comprising means operable to record data relating to the amount of fuel in the canister (see paragraph [0019]).

The subject-matter of **claim 13** is therefore not novel.

6.2 The subject-matter of **claims 14-17** is also disclosed by paragraph [0019] of document D3, and hence said claims are not new.

7. LACK OF INVENTIVE STEP

The subject-matter of claims 48-51 does not involve an inventive step in the sense of Article 33(3) PCT. The subject-matter of **claim 48** follows from a combination of documents D1 and D3. With regard to **claims 49-51** it should be noted that the "air mixer" for enabling oxidant recirculation (claims 49-51) and the "humidity detector" (claim 51) for detecting the humidity of the oxidant supply have already been employed for the same purpose (i.e. achieving proper humidification of the dry process gases) in a similar fuel cell system described in Document D4 or alternatively D2, see the citations provided by the search report. Moreover, the "hydride fuel supply canister" receiving heat from the fuel cell stack (claims 49-51) has been disclosed by document D1 and has a mere cooling purpose. As said features serve different purposes, the subject-matter of claims 49-51 **as such** provides a mere

juxtaposition of features disclosed by the documents D1, D3 and D4 as well as by documents D1, D3 and D2.

THIRD INVENTION

8. Reference is made to the following document:

D5: US 2003/059656 A1 (HORIGUCHI MUNEHISA ET AL) 27 March 2003

9. The document D5 discloses (the references in parentheses applying to this document):

A fuel cell system comprising a fuel cell stack (see 10 in Figure 1 or paragraph [0057]), a hydrogen supply source for supplying hydrogen fuel to the stack (see 52 in Figure 1), an arrangement for supplying air to the stack (see 14 in Figure 1), and a controller that is operable - on startup of the system - to inhibit the supply of hydrogen until air has been supplied to the stack (see paragraphs [0073] and [0074] and Figure 9).

The subject-matter of **claim 18** is therefore not novel.

10. The document D5 discloses (the references in parentheses applying to this document):

A fuel cell system comprising a fuel cell stack, a hydrogen supply source for supplying hydrogen fuel to the stack, an arrangement for supplying air to the stack (see the corresponding citations provided under paragraph 9 above), and a controller that is operable - on shutdown of the system - to inhibit the supply of hydrogen whilst continuing to supply air to the stack to flush residual hydrogen therefrom before subsequently inhibiting the supply of air to the stack (see paragraphs [0079] and [0080] and Figure 12).

The subject-matter of **claim 19** is therefore not novel.

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FOURTH INVENTION

11. Reference Is made to the following documents:

D6: EP-A-1 102 341 (KABUSHIKIKAISHA EQUOS RESEARCH) 23 May 2001
D7: US-A-5 156 928 (TAKABAYASHI ET AL) 20 October 1992
D8: US-B1-6 524 733 (NONOBE YASUHIRO) 25 February 2003

12. The document D6 discloses (the references In parentheses applying to this document):

A fuel cell system in which a controller is operable to monitor a voltage produced by a fuel cell stack after start-up, and to selectively inhibit the supply of electrical power to one or more other electrical components of the system until the voltage produced is sufficient to power said one or more components (see paragraphs [0078]-[0080]).

The subject-matter of **claim 20** is therefore not novel.

13. The features of dependent claim 21 in combination with the features of Independent claim 20 are dislosed by document D7 as well as by document D8, see the citations provided by the search report.

The subject-matter of **claim 21** is therefore not novel.